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## ABSTRACT

Described is the development and evaluation of a prenatal instructional program designed to prevent birth defects. It is explained that the program, composed of five slide tape units on such topics as nutrition and environmental factors, was field tested and found effective with 97 participants (pregnant high school students, nursing students, and participants in a planned parenthood program). Further data is reported which suggests that individuals retain the information across time. (CL)

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PRENATAL CARE TRAINING

Prepared For:

55th ANNUAL INTERNATIONAL CONVENTION  
THE COUNCIL FOR EXCEPTIONAL CHILDREN

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Each year in the United States more than 250,000 babies are born with serious birth defects. Some 60,000 fail to survive the first year of life. Reports have indicated that children with birth defects frequently do not receive medical help, special schooling, and/or skilled therapy that would enable them to develop a greater portion of their innate abilities, thus making birth defects one of the most seriously neglected problems of children today (Apgar, 1973; Scott, 1974).

In 1968 the Presidents Panel on Mental Retardation wrote that with the knowledge then available 50% of the cases of mental retardation could be prevented. What has been done to attain this goal? Current statistics do not show much progress. What can be done then to prevent many of the hazards of the prenatal environment.

There is knowledge available as to the causes of birth defects. For one example, each year 7,667 children are born with Down's Syndrome (mongolism) to mothers in the 35 and above age range. (Minunsky, 1973).

Children born to mothers over thirty-five years of age produced the following statistics bearing on the financial hardship of birth defects. The major portion of these children, because of their handicapping conditions, will become institutionalized at a later date and financial amounts can be estimated from this point on. It is estimated by the Walter E. Fernald, State School for Retarded Children, that an average cost of residential care for one patient is \$6,100 per year (1971). Assuming an average age expectancy of fifty years, it would cost an estimated \$305,000 for the life time care of one patient. For 7,667 patients, the conservative figure for care in one year reaches the figure of \$60 million, and for projected life time care, \$2,338,435,000. Therefore, the birth of 7,667 chromosomally defective children in one year could cost society in excess of \$2 billion or about thirty-two

times the cost of prevention through prenatal diagnosis and therapeutic abortion (Conley, 1973). These facts show the necessity proper prenatal care education. With skilled prenatal care, babies have a better chance of being born normal. Research shows that mothers who receive inadequate prenatal care give birth to premature and retarded children at two to three times the normal rate. Advances in medical knowledge about nutrition, genetics, vaccines, and other environmental effects make it possible to prevent birth defects in thousands of babies each year.

Despite growing recognition of the importance of prenatal care training (BEH, 1975; Luckey and Neman, 1975; Meier, 1975; President's Committee on Mental Retardation, 1976) few such programs have been developed to date. As Meier (1975) has argued:

There is a need for instructional programs which provide information about the various risk factors and the means for either preventing pregnancy in the first place, or ensuring as many positive conditions as possible for a planned pregnancy. (p.6)

Similarly (BEH, 1975), it has been pointed out that prenatal care training should be provided for school-age children so that they may:

1. Exercise reasonable control over their own destinies with respect to the decision to bear children and the circumstances under which they bear children.
2. Prepare themselves to be effective parents.
3. Develop understanding of the causes and consequences of handicapping conditions and greater acceptance of handicapped persons so that they may seek appropriate care early in pregnancy and help for their child should he or she develop a handicap. (p. 72)

In response to these needs, a mediated "Prenatal Care Training Program" was developed and validated at Utah State University (Instruction Technology Project, Department of Special Education) in consultation with the medical community.

The target population for the training program was made up of (a) expectant parents, (b) couples wanting children, and (c) prospective parents among junior and senior high school students.

The training materials were designed to function as an "instructional package." As defined by Kapfer and Kapfer (1972), an instructional package is a self-contained and systematized method of delivering content and process to learners. The total instructional package is made up of (a) five slide-tape units, (b) a participant's manual, and (c) a monitor's manual. The following subsections briefly describe the contents of these seven major components:

1. Unit 1: Prevention of birth defects. Provides information which can help individuals prevent various types of birth defects and understand why birth defects occur.
2. Unit 2: Nutrition. Explains what can happen to the fetus when a good diet is not provided for the mother. The various food groups are explained and the types of food they represent are outlined. Related factors presented are weight gain, rest and sleep, and exercise.
3. Unit 3: Heredity. This unit deals with genes and chromosomes (e.g., their development, etc.) and birth defects related to hereditary problems. Genetic counseling is also discussed.
4. Unit 4: Environmental Factors. The fourth unit deals with birth defects related to drugs, radiation and infections. Prematurity and its cause is also discussed.
5. Unit 5: Contraception. The six most common types of contraceptives are discussed in this unit (e.g., how they work; effectiveness, complications, side effects, etc.).
6. Participant's Manual. The participant's manual includes the following information relative to the five units: (a) specific behavioral objectives, (b) a summary of the main points discussed in each unit, (c) pre and post tests, and (d) references for further reading.
7. Monitor's Manual. Included in the monitor's manual are: (a) a brief description of the program, (b) specific instructions regarding the cassette tapes and slides, (c) procedures for each presentation, (d) answers to pre and post test items, (e) a participant's manual and (f) scripts for all five units.

The development and validation strategy centered on a research and development (R and D) process developed by Borg and Gall (1971) (Table 1). The sample used for the final field test consisted of 97 participants ranging from pregnant high school girls, family-life high school classes, nursing students,

and individuals in a planned parenthood program (Table 2). This field test was conducted at four test sites in Utah, Idaho, and Iowa.

Table 2 Operational Field Test Site Information

| Field Test Site                                                 | Students | Age   | Monitors | Occupation                                |
|-----------------------------------------------------------------|----------|-------|----------|-------------------------------------------|
| Soda Springs High School,<br>Soda Springs, Idaho                | 30       | 15-17 | 1        | Home-economics<br>Instructor              |
| Maternal Health Center,<br>Davenport, Iowa                      | 15       | 13-19 | 1        | Prenatal<br>Instructor                    |
| Garfield School<br>Salt Lake City, Utah                         | 14       | 13-18 | 1        | Teacher of expectant<br>high school girls |
| Planned Parenthood of<br>South East Iowa, Mt.<br>Pleasant, Iowa | 38       | 13-40 | 1        | Sex-education<br>Instructor               |

The effectiveness of the total instructional package was assessed by calculating the percentage of participants achieving a score of 80% on all post tests. Considering the instructional package as a total unit, 80% of those participating in the operational Field Test achieved a score of 80% or better on all post instruction performance assessments (Table 3).

TABLE 3

Percentage of Participants Attaining 80 Percent Criterion  
on Unit Post Test by Field Test Site for the Total Sample

| Location<br>Number | Field Test<br>Site  | Unit |      |     |     |     | All<br>Units |     |
|--------------------|---------------------|------|------|-----|-----|-----|--------------|-----|
|                    |                     | I    | II   | III | IV  | V   |              |     |
| 1.                 | *Soda<br>Springs    | 100% | 97%  | 97% | 97% | 87% | 96%          |     |
| 2.                 | *Davenport          | 100% | 100% | 53% | 80% | 87% | 84%          |     |
| 3.                 | **Salt Lake<br>City | 64%  | 50%  | 50% | 64% | 86% | 63%          |     |
| 4.                 | ***Mt.<br>Pleasant  | 84%  | 84%  | 42% | 71% | 97% | 76%          |     |
| Total Sample       |                     | 6    | 87%  | 83% | 61% | 78% | 89%          | 80% |

\*Sites where both pre and post tests were administered.

\*\*Sites where post test only was administered.

Student reaction to the instructional package met the acceptable criterion on all aspects rated. Criteria for exportability was met by the instructional package.

TABLE 4  
Percentage of Participant Responses

| Unit  | Interest<br>Rating | Audio<br>Rating | Visual<br>Rating | Objectives<br>Met | Handout<br>Material |
|-------|--------------------|-----------------|------------------|-------------------|---------------------|
| I     | 99%                | 100%            | 100%             | 100%              | 100%                |
| II    | 100%               | 100%            | 100%             | 100%              | 100%                |
| III   | 94%                | 97%             | 97%              | 98%               | 98%                 |
| IV    | 100%               | 100%            | 100%             | 100%              | 100%                |
| V     | 99%                | 93%             | 99%              | 98%               | 99%                 |
| Total | 98%                | 98%             | 99%              | 99%               | 99%                 |

Following the Operational Field Test in which the Prenatal Care Training Program was considered to be an effective instructional program, two additional questions were asked: 1) is there any long term retention of the concepts presented; and 2) is there an overall association among selected demographic variables and success in the Prenatal Care Training Program?

Sixty-seven individuals participated in this research project. Forty male and female participants were from Illinois attending a local university. Seven male and female participants were from the State of Utah attending a prenatal care class. The remaining eleven participants were high school expectant

TABLE 1

## The Major Steps in the Development Cycle

| STEPS                                     | ACTIVITIES                                                                                                                                                                                                                                                                                          |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Research and data gathering            | Includes review of literature, classroom observations, and preparation of report on the state of the art.                                                                                                                                                                                           |
| 2. Planning                               | Includes definition of skills, statement of objectives, determination of course sequence, and small-scale feasibility testing.                                                                                                                                                                      |
| 3. Developing preliminary form of product | Includes preparation of instructional and model lessons, handbooks, and evaluation devices.                                                                                                                                                                                                         |
| 4. Preliminary field test                 | Conducted by R and D personnel in one, two or three schools, using between six and twelve teachers. Includes collection and analysis of interview, observational and questionnaire data.                                                                                                            |
| 5. Main product revision                  | Revision of product as suggested by preliminary field test results.                                                                                                                                                                                                                                 |
| 6. Main field test                        | Conducted by R and D personnel in between five and fifteen schools using between thirty and one hundred teachers. Includes collection of quantitative data on teachers' pre and post-course performances, usually in the form of classroom videotapes. Results are compared with course objectives. |
| 7. Operational product revision           | Revision of product as suggested by the main field test results.                                                                                                                                                                                                                                    |
| 8. Operational field test                 | Conducted by regular school personnel in between ten and thirty schools, using between forty and two hundred teachers. Includes collection and analysis of interview, observation, and questionnaire data.                                                                                          |
| 9. Final product revision                 | Revision of product as suggested by operational field test results.                                                                                                                                                                                                                                 |
| 10. Dissemination and distribution        | Reports at professional meetings, in journals, etc. Includes work with publisher who assumes commercial distribution, and monitoring quality control.                                                                                                                                               |

mothers attending a special high school program in Utah.

A schematic representation of the research design is as follows:

TABLE 5  
Research Design

|                                    |        | September     | December    | March       | May         |
|------------------------------------|--------|---------------|-------------|-------------|-------------|
|                                    |        | Pre/Post Test | Post Test A | Post Test B | Post Test C |
| Demographic and<br>Attitude Survey | Unit 1 | 0 X 0         | 0           | 0           | 0           |
|                                    | Unit 2 | 0 X 0         | 0           | 0           | 0           |
|                                    | Unit 3 | 0 X 0         | 0           | 0           | 0           |
|                                    | Unit 4 | 0 X 0         | 0           | 0           | 0           |
|                                    | Unit 5 | 0 X 0*        | 0           | 0           | 0           |
| * Post Additional Survey           |        |               |             |             |             |
| 0 Criterion Referenced Test        |        |               |             |             |             |
| X Treatment                        |        |               |             |             |             |

Question 1, was there any long term retention of the concepts presented? A t-test was used to determine the statistical significance between the initial pre and post tests and subsequent post tests for each unit of instruction. Table 6 presents the levels of statistical significance for each unit of instruction over the nine month period of time.

TABLE 6

Level of Significance for Prenatal Care Training Across Time

| September     |               | December     |  | March       |  | May           |  |
|---------------|---------------|--------------|--|-------------|--|---------------|--|
| Pre-Post Test |               | Post Test A  |  | Post Test B |  | Post Test C   |  |
| Unit I        | 7.94 (<.001)  | 1.51 (<.20)  |  | 1.96 (<.10) |  | 2.19 (<.05)   |  |
| Unit II       | 7.11 (<.001)  | 3.23 (<.01)  |  | .56         |  | 11.14 (<.001) |  |
| Unit III      | 10.52 (<.001) | 3.97 (<.001) |  | .70         |  | 1.81 (<.10)   |  |
| Unit IV       | 10.88 (<.001) | 4.07         |  | .72         |  | 2.07 (<.05)   |  |
| Unit V        | 12.64 (<.001) | 1.37         |  | .94         |  | 2.60 (<.02)   |  |

Question 2, was there an overall association among selected demographic variables and success in the Prenatal Care Training Program? Data regarding student mastery and 10 commonly studied student demographics were gathered in the Prenatal Care Training Sessions via questionnaires prior to the first pretest. (Appendix A)

Data were gathered for 20 post tests (5 units X 4 administrations) over a nine month period to ascertain the long-range effects of the training program. Table 7 indicates that 66% of the statistically significant (P .05) associations were accounted for by one-third of the independent variables (age, income, and marital status).

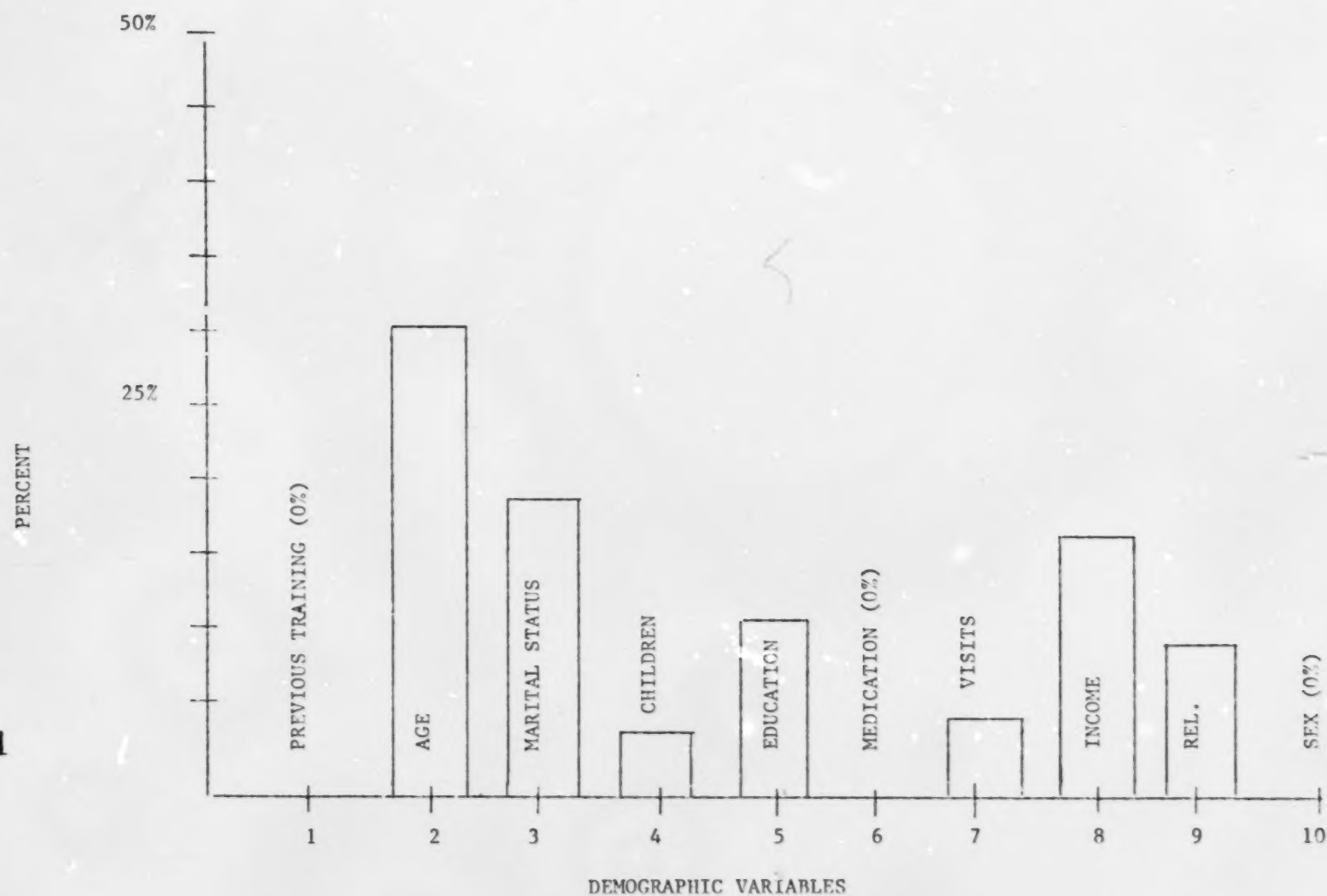


Table 7 Percent of Statistically Significant Relationships among 10 Demographic Variables and Mastery for 64 Trainees.

This was one small step in the prevention of birth defects through the use of an instructional program. Being aware of the many problems and variables relating to the prevention of birth defective children the Prenatal Care Training is the first validated instructional package attempting to identify the human variables that tend to be important predictors of individuals who perform significantly better on the post test for each unit of instruction. Secondly, this was a first attempt to observe learning of prenatal material over an extended period of time. The data suggests that individuals retain this information as it has a direct bearing on the lives of each prospective child.

In conclusion, further research activities must be supported by local, state and federal programs to close the gap between the number of handicapped children we presently have and where we should be in relation to the technology in existence.

The instructional package Prenatal Care Training Program is available through the Special Education Instructional Technology Project, UMC-68, Utah State University, Logan, Utah 84322.

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